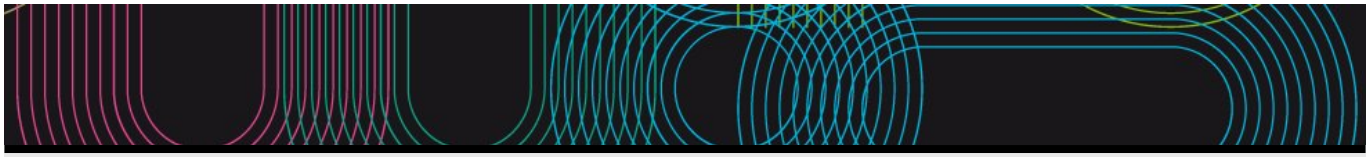

IDENTIFYING DATA				
Audio Systems				
Subject	Audio Systems			
Code	V05G300V01532			
Study programme	Degree in Telecommunications Technologies Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	1st
Teaching language	Spanish			
Department	Signal Theory and Communications			
Coordinator	Pena Giménez, Antonio			
Lecturers	Pena Giménez, Antonio			
E-mail	apena@gts.uvigo.es			
Web	http://faitic.uvigo.es			
General description	The chain of audio systems is presented, from a systemic point of view. Each system is revised: configuration, specifications, quality figures and interaction with other systems.			

Competencies	
Code	
B3	CG3: The knowledge of basic subjects and technologies that enables the student to learn new methods and technologies, as well as to give him great versatility to confront and adapt to new situations
B5	CG5: The knowledge to perform measurements, calculations, assessments, appraisals, technical evaluations, studies, reports, task scheduling and similar work to each specific telecommunication area.
B6	CG6: The aptitude to manage mandatory specifications, procedures and laws.
B9	CG9: The ability to work in multidisciplinary groups in a Multilanguage environment and to communicate, in writing and orally, knowledge, procedures, results and ideas related with Telecommunications and Electronics.
B12	CG12 The development of discussion ability about technical subjects
C34	CE34/SI1The ability to construct, exploit and manage telecommunication services and applications, such as receiving, digital and analogical treatment, codification, transporting and representation, processing, storage, reproduction, management and presentation of audiovisual and multimedia information services.
C35	CE35/SI2 The ability to analyze, specify, carry out and maintain systems, equipments, heads and installations of TV, audio and video for mobile and fixed environments.
C37	CE37/SI4 The ability to carry out acoustic engineering projects related to: acoustical isolation and conditioning of rooms, loudspeaker installations, specification, analysis and selection of electro acoustical transducers, measurement, analysis and control of radio vibration systems, environmental acoustics, submarine and acoustical systems.
D3	CT3 Awareness of the need for long-life training and continuous quality improvement, showing a flexible, open and ethical attitude toward different opinions and situations, particularly on non-discrimination based on sex, race or religion, as well as respect for fundamental rights, accessibility, etc.
D4	CT4 Encourage cooperative work, and skills like communication, organization, planning and acceptance of responsibility in a multilingual and multidisciplinary work environment, which promotes education for equality, peace and respect for fundamental rights.

Learning outcomes			
Expected results from this subject	Training and Learning Results		
Results of learning (SI2.1): ->Understand and discuss levels in audio systems ->Know the differente types of audio amplifier, from a systems point of view. Discuss technical specifications to compare them.	B3 B5 B6 B12	C35	
Results of learning (SI4.2): -> Select a configuration for taking sound in different scenarios.	B3 B12	C37	D3

Results of learning (SI1.2): -> Know and understand the operation of dynamic range processors and its application in a chain of audio systems. -> Apply equalization techniques and other processes. ->Schedule and carry out a mixture of sounds from the technical point of view, showing the knowledge of different tools to achieve an artistic result. -> Discuss the influence of the available parameters of a digital audio format of audio in the final quality. ->Explain several elements and interconnection protocols to allow the transport and synchronization of audio signals. Results of learning (SI1.3): -> Understand the basics of spatial audition and 3-d audio systems. -> Understanf the concept 'quality' in a given audio application	B3 B12	C34	D3
Results of learning Organize a working group to carry out a project, including the following: -> technical ability to collect information, interpret technical specifications, discuss several options and select a combination of audio systems. -> Write progress reports, minutes of meetings and a final technical report . -> Technical meetings, discussion of partial results and oral presentation of the final work in front of a demanding audience. -> Adaptation to new environments , internal management roles in the group and dispute resolution. -> Internalize the importance of the human relationship with the client , preserving a fluent contact.	B9 B12	C37	D3 D4

Contents	
Topic	
Specifications.	Level meters. Impedances. Specifications.
Dynamic range and processes.	Dynamic range. Compressors and expansors. Filtering. Effects.
Amplifiers.	Types.Characterization.
Mixture of sounds.	Lineal mixture of sounds. Event-controlled sound mixture for interactive systems.
Sound quality.	Concept of quality. Estimate of quality.
Spatial audio (3-D).	Spatial audition. 3-d audio systems.
Digital audio.	Audio sampling systems. Specifications and sources of noise. Dithering. Synchronization and transport. MIDI.

Planning			
	Class hours	Hours outside the classroom	Total hours
Computer practices	14	10.5	24.5
Studies excursion	0	7	7
Project based learning	7	52.5	59.5
Autonomous practices through ICT	0	10	10
Lecturing	19	24	43
Short answer tests	2	0	2
Objective questions exam	0	4	4
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Methodologies	
	Description
Computer practices	Handle and adjustment of tools of analysis and algorithms, identifying which is appropriate for a given situation. Through this methodology, competencies CT3, CG3 and CE34 are developed.
Studies excursion	Visits to places where the concepts discussed are applied (radio studio, recording studio, etc.). Due to availability and funding. Through this methodology, competency CE34 is developed.
Project based learning	Collaborative work in reduced groups. A complex design with a regular monitoring agenda. Role assignments, working in common, planning, technical reports and oral presentation. Through this methodology, competencies CT3, CT4, CG3, CG12, CG5, CG6, CG9, CE34, CE35 and CE37 are developed.
Autonomous practices through ICT	Written and/or audiovisual material is provided to study and prepare an online test. This activity is prior to the master class or practice in computer rooms where doubts will be resolved and challenges will arise. Through this methodology, competencies CG3 and CE35 are developed.
Lecturing	Oral speech, promoting the critical discussion of the concepts. Theoretical bases of algorithms and procedures used to solve problems are presented. Through this methodology, competencies CT3, CG3, CG12, CE34, CE35 and CE37 are developed.

Personalized attention

Methodologies	Description
Lecturing	Tutoring to solve issues related to master sessions or lab practice is implemented: -> Individually or -> in reduced groups (no more than 2-3 students). E-mail confirmation to match the date of the appointment is needed.
Computer practices	Tutoring to solve issues related to master sessions or lab practice is implemented: -> Individually or -> in reduced groups (no more than 2-3 students). E-mail confirmation to match the date of the appointment is needed.
Project based learning	During group projects an individualized tracking of the student is developed. Cross-avaliation within the group and autoavaliation may be used.

Assessment

	Description	Qualification	Training and Learning Results		
Computer practices	Work assessment in the computer room.	10	B3	C34	D3
Project based learning	Assessment of a collaborative work, developed along the semester, including a written report and oral presentation.	50	B3 B5 B6 B9 B12	C37	D3 D4
Short answer tests	Written test with short questions and problems to solve.	35	B3 B12	C34 C35	
Objective questions exam	Automatic corrected online test.	5	B3	C35	

Other comments on the Evaluation

Following the guidelines of the studies, two evaluation systems will be offered to the students inscribed on this subject: continuous evaluation (the preferred method, academic activities are linked to this system) and evaluation at the end of the semester (not recommended).

*** "Students who choose continuous evaluation" conditions:**
A student follows the continuous evaluation system if she/he assigns a document that will be delivered and collected during weeks 1-3, so the collaborative work can begin.
If a student has participated in continuous evaluation and does not pass the course he/she will receive a grade of fail, regardless of he/she takes the written exam or not.

BONUS SYSTEM
* Group: a weekly score of the groups is publicly published. * Individual: a monthly score of the students is privately published.

Up to a maximum of 1.5 points may be added to the final group mark.In no case, this bonus is negative.Details will be given at the beginning of the course.

CONDITIONS TO PASS THE SUBJECT

Once bonus points are added, in order to ensure that students acquire a balanced minimum on the subject competences, they will pass the course if they meet these two conditions:
1) get a final mark equal to or greater than 5 (on a ten-points scale)
2) and a score equal to or greater than 4 (on the same scale) in each of the partial marks (written exam and collaborative group, respectively).
If some of these conditions are not fulfilled, then the final grade (on a ten-points scale) will be the minimum between the final mark and the value "4".
Time planning of intermediate evaluation exams will be approved by the Comisión Académica de Grado (CAG) and will be available at the beginning of the semester.
*** "Students who choose for evaluation at the end of the semester" conditions:**
The possibility of a final examination will be provided to students who do not opt for the continuous evaluation.
In order to ensure that students acquire a balanced minimum on the subject competences, they will pass the course if they meet both these two conditions:
1) get a final mark equal to or greater than 5 (on a ten-points scale)
2) and a score equal to or greater than 4 (on the same scale) in each of the sections of the exam. These sections, respectively, correspond with:
* contents included in all activities* project developed in group, including group internals, management, writing of technical reports and oral presentations.

If some of these conditions are not fulfilled, then the final grade (on a ten-points scale) will be the minimum between the final mark and the value "4".

--- RETAKE

Two different situations:
=> Students that are evaluated using continuous evaluation:
Two options to choose (just before the exam begins):
* repeat the written exam included in the continuous evaluation planning an be evaluated under the "Students who choose continuous evaluation" conditions, described above.
* be evaluated with the same final exam of students who choose for evaluation at the end of the semester, under the "Students who choose for evaluation at the end of the semester" evaluation conditions, described above. No other activities are considered.
=> Students who choose for evaluation at the end of the semester:
A final examination will be provided to students who do not opt for the continuous evaluation, and are evaluated under the "Students who choose for evaluation at the end of the semester" conditions, described above. No other activities are considered.

Sources of information

Basic Bibliography

Bruce and Jenny Bartlett, **Practical recording techniques**, Ed. 7, Focal press, 2016

Davis, Gary, **The Sound reinforcement handbook**, 2nd edition, Milwaukee (Winsconsin) : Hal Leonard Corporation,

Complementary Bibliography

Francis Rumsey and Tim McCormick, **Sound and recording**, Ed. 7, Focal press, 2014

Philip Giddings, **Audio systems: design and installation**, Focal press, 1990

Recommendations

Subjects that continue the syllabus

Sound Processing/V05G300V01634
Audiovisual Technology/V05G300V01631

Subjects that are recommended to be taken simultaneously

Fundamentals of Acoustics Engineering/V05G300V01531

Subjects that it is recommended to have taken before

Fundamentals of Sound and Image/V05G300V01405
Digital Signal Processing/V05G300V01304